Claims: Cancel all claims of record and substitute new claims as follows.

29. A method for encrypting and decrypting raw digital images comprising the steps of:

using a cyclotomic polynomial to generate an encrypting algebraic transform;

partitioning said raw digital images into data blocks;

calculating encrypted data blocks with said encrypting algebraic transform and said data blocks; and

calculating decrypted data blocks with the inverse of said encrypting algebraic transform and said encrypted data blocks.

30. The method of claim 29, wherein said using step includes the step of determining a mathematical algebraic equation representing said encrypting algebraic transform, and said mathematical algebraic equation is said cyclotomic polynomial.

31. The method of claim 29, wherein said using step includes the step of determining a mathematical algebraic equation representing said encrypting algebraic transform, and the coefficients of said mathematical algebraic equation are calculated with said cyclotomic polynomial.

32. The method of claim 29, wherein said using step includes the step of determining a mathematical algebraic equation representing said encrypting algebraic transform, and said mathematical algebraic equation is modulo said cyclotomic polynomial.

33. The method of claim 30, wherein said raw digital images are raw color digital images.

34. The method of claim 31, wherein said raw digital images are raw color digital images.

35. The method of claim 32, wherein said raw digital images are raw color digital images.

36. The method of claim 33, wherein said raw color digital images comprise a set of raw images in digital cinema.

37. The method of claim 34, wherein said raw color digital images comprise a set of raw images in digital cinema.

38. The method of claim 35, wherein said raw color digital images comprise a set of raw images in digital cinema.

39. A method for encrypting and decrypting raw digital images comprising the steps of:

using a radiometric expression derived from said raw digital images to generate a bit sequence;

partitioning said raw digital images into data blocks with length equal to the length of said bit sequence;

combining said bit sequence and said data blocks to form encrypted data blocks; and

separating said bit sequence and said data blocks to form unencrypted data blocks.

40. The method of claim 39, wherein said bit sequence is used to calculate a base point.

41. The method of claim 40, wherein said raw digital images are raw color digital images.

42. The method of claim 41, wherein said raw color digital images comprise a set of raw images in digital cinema.

43. The method of claim 40, wherein said calculating base point step includes the steps of:

deriving a bitwise expression for said radiometric expression; and

converting said bitwise expression to a high precision integer.

44. The method of claim 43, wherein said raw digital images are raw color digital images.

45. The method of claim 44, wherein said raw color digital images comprise a set of raw images in digital cinema.

46. The method of claim 39, wherein said radiometric expression is substantially a black metamer.

47. The method of claim 39, wherein said radiometric expression is substantially a fundamental metamer.

48. The method of claim 39, wherein said radiometric expression is substantially a radiometric function.

49. A method for encrypting and decrypting raw digital images comprising the steps of:

using a cyclotomic polynomial to generate an encrypting algebraic transform;

partitioning said raw digital images into data blocks;

calculating encrypted data blocks with said encrypting algebraic transform, said data blocks and a radiometric expression derived from said raw digital images; and

calculating decrypted data blocks with the inverse of said encrypting algebraic transform and said encrypted data blocks.

50. The method of claim 49, wherein said calculating encrypted data blocks step includes the step of combining said data blocks with said radiometric expression.

51. The method of claim 50, wherein said combining step includes the steps of:

deriving a bitwise expression for said radiometric expression; and

combining said bitwise expression and said data blocks with an exclusive-or mathematical operation.

52. The method of claim 51, wherein said raw digital images are raw color digital images.

53. The method of claim 52, wherein said raw color digital images comprise a set of raw images in digital cinema.

54. The method of claim 50, wherein said radiometric expression is substantially a fundamental metamer.

55. The method of claim 50, wherein said radiometric expression is substantially a black metamer.

56. The method of claim 50, wherein said radiometric expression is substantially a radiometric function.

Remarks – General

The applicants have rewritten the claims to define the invention more particularly and distinctly so as to overcome the technical rejections and define the invention as patentable over the prior art.

Clarification on the Invention Disclosed in Zeng et al US Patent No 6,505,299

The methods and apparatus described in Zeng et al in US Patent No. 6,505,299 (hereinafter '299) for the encryption and decryption of digital images have, as a necessary step, the application of a space-frequency transform prior to the encryption operation ('299 col. 3, lines 25-36).

The space-frequency transform results in a transform coefficient map ('299 col. 3, lines 25-28). The coefficients in the transform coefficient map contain spatial frequency and spatial location information ('299 col. 4, 41-44). They are derived from a discrete cosine transform (DCT) described in '299 col. 4, line 66 through col. 5, line 14. The coefficients in the map are scrambled through an encryption operation. ('299 col. 3, lines 28-35).

The decryption operation descrambles the coefficients in the transform coefficient map ('299 col. 3, lines 58-60).